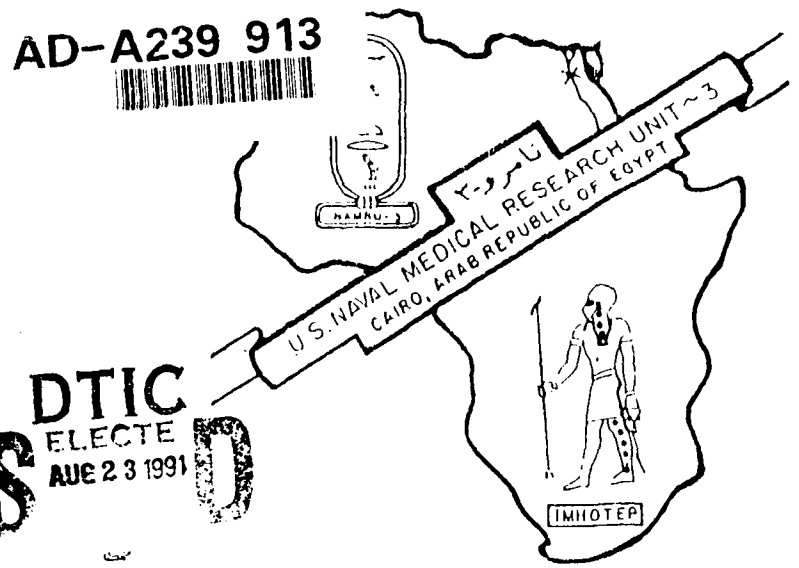

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LOW PREVELANECE OF HIV INFECTION IN DJIBOUTI -
HAS THE AIDS EPIDEMIC COME TO A STOP AT THE HORN OF AFRICA?

BY

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Low prevalence of HIV infection in Djibouti—has the AIDS epidemic come to a stop at the Horn of Africa?

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Abstract

To determine if the HIV-epidemic had reached Djibouti by autumn 1987, we investigated 645 subjects belonging to various risk groups; 150 were patients with a disease compatible with acquired immune deficiency or with a mycobacterial infection, 115 were young males having a sexually transmitted disease, 295 were female prostitutes, and 69 were villagers from a rural area; the remaining 16 belonged to other groups. All subjects answered an epidemiological questionnaire and had their serum tested for evidence of HIV antibodies. Eight sera were HIV-antibody positive by both ELISA and Western blot. Of these, 2 were from young men while 6 were from young women who admitted to prostitution. This accounts for an HIV seropositivity rate of 2·0%±1·6% in the prostitute population. Also, one antibody-positive subject was positive for circulating HIV antigen. Seven of the seropositive individuals had no general complaints or abnormal clinical signs. The eighth subject was a 28 year old man in hospital for pneumonia. We conclude that in Djibouti, in late 1987, the prevalence of both AIDS and HIV infection in high risk individuals was much lower than that reported from other East African countries.

Introduction

The acquired immunodeficiency syndrome (AIDS) is a fatal disease complex related to infection of T-helper lymphocytes with human immunodeficiency virus (HIV) (COFFIN *et al.*, 1986). Since 1983, patients from Central African countries like Rwanda, Zaire and Uganda have been diagnosed as having AIDS (CLUMECK *et al.*, 1984). From Central Africa, HIV infection and AIDS seem to be spreading to both East and West Africa (QUINN *et al.*, 1986). Transmission of the virus in Africa is thought to be primarily through heterosexual intercourse (VAN DE PERRE *et al.*, 1985), reuse of contaminated needles (WYATT, 1986), and mother-infant transmission (MANN *et al.*, 1986a).

Djibouti is a small country, situated in the northernmost part of the Horn of Africa. Its inhabitants belong to diverse ethnic groups, mainly Somali, Afar and Arab. A majority of the population lives in the capital city, Djibouti. Culturally, however, Djiboutians are nomadic and travel freely all over the region. The country's borders are widely open on all sides: to the sea in the east through the international port, to Ethiopia in the north and west, and to Somalia in the south. The risk of the country being invaded by HIV is therefore very real, and it became necessary to organize a systematic and continuous surveillance programme to monitor the HIV and AIDS situation throughout the Republic of Djibouti. A preliminary nation-wide serosurvey was started in October 1987 by the Ministry of Health with the assistance of the World Health Organization (WHO) and NAMRU-3. The present report describes the AIDS and HIV prevalence in Djibouti in autumn 1987.

Methods

Study population

The study, carried out during October 1987, consisted of a multipopulation screening survey as follows.

(i) Screening of patients with diseases compatible with immunosuppression (Group 1). Patients in Hôpital Général Peltier, the major referral hospital in Djibouti, were examined for evidence of AIDS using the WHO criteria for the clinical diagnosis of AIDS in Africa (WHO, 1986).

(ii) Screening of patients with mycobacterial infections (Group 2). Patients with pulmonary tuberculosis (TB) and patients with extrapulmonary TB (in particular lymph node TB) were studied at the Centre Paul Faure. Some patients with multibacillary leprosy were selected from the Centre de Prophylaxie. These TB patients were included in the screening survey since, in Africa, patients with pulmonary TB have a high prevalence of HIV seropositivity (MANN *et al.*, 1986b), while lymph node TB has been described as

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The 'Enquête sur le SIDA à Djibouti' study group consisted of the following persons and institutions (an asterisk denotes a principal investigator): Direction Technique de la Santé: Dr Abbatte; Ministère de la Santé publique: Dr Albert; WHO, Djibouti: Dr Wassef*; Hôpital Peltier: Dr Berger, Dr Santiago, Dr Cazaban and Dr M. Abdulrahman; Centre Paul Faure: Dr Aurégan*, Dr Chakib, Dr Ibrahim and Mrs Aysha Aubane; Centre de Prophylaxie: Dr Tolédo* and Mrs Wahbia; Service d'Hygiène et d'Epidémiologie: Dr Bailly and Dr Said*; Service Médicale Inter-entreprise: Dr Said; Cabinet Médical: Dr Rodier* and Mr Adel; Dispensaire de Randa: Dr Quézédé; Service de Santé, Ministère de la Défense: Dr Asselin*; NAMRU-3: Dr Woody*, Dr Bishop, Dr Fox*, Mr Sidrak, Dr Constantine, Dr Morrill and Mr Bamberg.

an opportunistic infection in African AIDS (BIGGAR, 1986).

(iii) Screening of male subjects having a sexually transmitted disease (STD) (Group 3). Young men attending an outpatient clinic with STD were studied at the Service Médical Inter-entreprise, at the National Army Health Centre, at the Service d'Hygiène and at a private practitioner's clinic in Djibouti.

(iv) Screening of female prostitutes (Group 4). Barmaids and street prostitutes were studied at a private practitioner's clinic and at the Centre de Prophylaxie, an institution where prostitutes are examined regularly.

(v) Screening of a rural population (Group 5). Randa, a village in northern Djibouti, was selected for inclusion in the study because of the relative stability of its inhabitants, which made it a good rural control area.

Patient investigations

Nine Djiboutian study teams were trained for data collection. Each study subject had a medical interview and clinical examination performed by a study team's physician or other health worker, who was fluent in the local languages. The interview comprised 75 variables while the clinical examination comprised 25 variables. Results were entered into computerized data files on a daily basis.

Up to 10 ml of venous blood were drawn from each subject and the blood allowed to clot at ambient temperature. The serum was separated and kept refrigerated until tested. Patients in hospital (groups 1 & 2) had additional blood drawn with anticoagulants for determination of total and differential white blood cell counts.

All sera were screened in Djibouti for the presence of antibodies to HIV using a commercial enzyme-linked immunosorbent assay (ELISA) (HTLVIII EIA, Abbott Laboratories, North Chicago, USA). ELISA positive sera were retested by the same assay, and later in Cairo by the more specific Western blot assay (Dupont, Biotech, Wilmington, Delaware, USA) to obtain definite confirmation of the presence of antibodies to specific HIV proteins. Western blot positive sera were defined by the detection of antibodies to at least the p24 and either gp41 or gp120 kilodalton molecular weight HIV proteins. All confirmed HIV sera, and a sample of sera from very active prostitutes, were also tested for circulating HIV antigen by the Abbott ELISA antigen assay.

Results

645 subjects were included in the study. They were from diverse geographical and ethnic origins and comprised 204 Somalis, 114 Afars, 231 Ethiopians, 10 Arabs, 7 Europeans and others, and 79 individuals of undetermined origin. The 645 subjects were distributed among the 5 study groups as follows: 41 hospital patients with a disease compatible with underlying immunodeficiency (group 1); group 2 comprised 109 patients with a mycobacterial disease, 14 with leprosy and 95 with tuberculosis (64 pulmonary TB, 25 lymph node TB, 3 miliary TB and 3 extrapulmonary TB); group 3 were 115 male subjects having STD; group 4 consisted of 295 prostitutes; group 5 was 69 inhabitants of the control village Randa; group 6 comprised the remaining 16 subjects, who could not be classified into any of the defined categories.

Comparisons of relevant personal characteristics between the study groups are shown in Table 1. Non-venereal risk factors for the acquisition of HIV are shown in Table 2.

All study subjects had their serum tested for HIV antibodies by the commercial Abbott ELISA. Ten sera reacted when first tested. Eight sera remained reactive when retested, and these 8 were all confirmed as positive by Western blot analysis. Hence, the HIV seropositivity rate in the whole study population was

Table 2. Non-venereal AIDS risk factors in the total study population of 645 persons

	Percentage with characteristic
Interview data	
Recent travel to a country that has declared AIDS cases	33·3
Family member sick with a disease compatible with AIDS	2·0
Scarifications	7·6
Tattoes	4·8
Oral drug abuse	27·9
Intravenous drug abuse	0
Medical History data	
Recent medical injections (among these, the mean number of injections was 17)	65·4
Vaccinations	64·7
Recent dental work	16·3
Recent hospital stay	20·0
Recent surgery	6·4
Recent blood transfusion	5·0
Females with induced abortions	4·1
Previous jaundice	9·4
Consulting bushdoctors (of these, only 2·4% had received skincuts)	16·1

Table 1. Selected demographic and sexual characteristics according to study groups

	Total population	Group 1 Hospital patients	Group 2 TB and leprosy patients	Group 3 Male STD[a] subjects	Group 4 Prostitutes	Group 5 Randa villagers	Group 6 Miscellaneous
Sample size	645	41 (6·4%)	109 (16·9%)	115 (17·8%)	295 (45·7%)	69 (10·7%)	16 (2·5%)
Mean age (years)	27	30	29	31	24	28	27
	Percentage with characteristic		Percentage with characteristic		Percentage with characteristic		
Females	60·9	58·5	34·9	0	100	36·2	69
Married	29·8	73·2	44·4	54·8	0	62·3	21
Educated	49·9	28·4	28·4	62·6	56·3	47·8	88
Knowledge of STD[a,b]	87·8	51·2	77·1	91·3	98·7	73·9	92
History of STD[a]	49·1	4·9	19·3	54·8	60·5	29·2	55

[a]Sexually transmitted diseases.
[b]Percentage of subjects aware of the existence of STD.

1·2% (upper limit of the 95% confidence interval (95% CI): 3·1%). Six of the 393 females tested were positive (1·5%) compared with 2 of the 252 males (0·8%), giving a ratio of seropositive females to seropositive males of 1·9/1.

39 sera were tested for circulating HIV antigen; only one was positive and this was confirmed by the Abbott neutralization assay. This serum came from a street prostitute, 26 year-old, confirmed as positive by Western blot, who had about 28 weekly customers and recalled 3 previous episodes of gonorrhoea. Since she was asymptomatic and in good general health, and since she had an intense p24 band by Western blot, her HIV infection was probably of recent origin. All other sera tested were negative in this assay, in particular the sera of the 29 very high risk, but antibody-negative, prostitutes; thus, very early infections were excluded in this exposed group.

Case reports

All 6 seropositive females admitted to prostitution, corresponding to an HIV seropositivity rate in prostitutes of 2% (95% CI, 0·4% to 3·6%). Four of the seropositive prostitutes were of Ethiopian origin, 1 was Somali and 1 Djiboutian. Three were barmaids and 3 street prostitutes. The barmaids all used condoms regularly, while the street prostitutes never did. Their customers were Djiboutians, Ethiopians, Somalis, Arabs and French. Three subjects had a history of several episodes of gonorrhoea, and 4 had received prior medical injections (10 injections on the average). None had a history of previous jaundice, but one had a recent bout of unexplained fever. All 6 cases felt in good general health at the time of the survey, and 5 had no clinical symptoms or abnormal clinical findings, although one complained of generalized pruritis and had a clinical diagnosis of primary syphilis.

In the male STD group, only one subject was HIV seropositive. He was a 21 year old unmarried student who visited inexpensive Ethiopian prostitutes regularly (twice a week). He never used condoms and had a history of 2 treated gonorrhoeal episodes. He had received about 10 medical injections previously. He felt in good general health, but had enlarged inguinal lymphnodes.

Finally, the only seropositive patient diagnosed at the hospital was a 28 year old, married, uneducated and unemployed man living in the District of Dikhil, more than 150 km west of Djibouti city. He claimed that he had no extramarital relations. He had never received medical injections, vaccinations, or blood transfusions, but had been circumcised at the age of 19 years. He had not been in hospital previously. On admission, he complained of insomnia, fatigue and headache. He had lost more than 10% of his body weight and had a cough of less than 1 month's duration. His spleen was slightly enlarged. He had been diagnosed as having pneumonia. His total white blood cell count was 7400 per ml, with 2960 lymphocytes.

Discussion

Our preliminary results suggest that there was little AIDS in Djibouti in October 1987 and that the prevalence of HIV infection in sexually promiscuous individuals was very low at that time. In particular, the seropositivity rate in prostitutes in Djibouti was only 2%. This finding optimistically contrasts with the alarming HIV situation in Kenya's capital Nairobi, where HIV prevalence rates as high as 80% have been described in some sexually promiscuous groups (KREISS *et al.*, 1986).

The AIDS epidemic does not seem to be invading North-East Africa (EL TIGANI *et al.*, 1988) with the rapidity with which it has already swept over large parts of Central and East Africa (QUINN *et al.*, 1986). Could our results indicate that HIV has not yet reached in Djibouti a level comparable to the level, for instance, in Kenya? Or could it be that an increased genetic resistance to infection by HIV may characterize the inhabitants of that part of Africa, thereby explaining why the AIDS epidemic seems to be deterred from spreading? Inhabitants of North-East Africa have genetically different origins from the Central African Bantu populations. In East Africa, genetic groups include Nilotic and Hamitic populations among others, and there has been an additional genetic input from various North African and West Asian populations, especially from the Arabian peninsula. Studies to determine whether inhabitants of Djibouti have genetic characteristics suggesting resistance to infection by HIV are presently under way at NAMRU-3.

The type of screening survey started in October 1987 in Djibouti will need to be repeated in the future on a larger scale and to include the testing of members of other high risk groups. Regular screening will help to detect possible new seropositive individuals, and enable adequate measures to be arranged for preventing the HIV infection from developing into an epidemic. The emergence of AIDS as an overwhelming public health problem might then be averted, and Djibouti could escape the fate experienced by some of the Central African countries like Zaire, where AIDS has turned into a major killer of hitherto unimaginable ferocity.

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Short Report

Incidence of intramuscular injections in rural dispensaries in developing countries

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The transmission of acquired immunodeficiency syndrome (AIDS) in tropical countries is essentially heterosexual (PIOT *et al.*, 1984). However, transmission by intramuscular injections performed with incorrectly sterilized materials is suspected (VACHON, 1987). A study carried out in Haiti (PAPE *et al.*, 1985) has shown that patients with AIDS had received more intramuscular injections during the 5 year period before the onset of their disease than a control group (with a statistically significant difference). To the probable risk of human immunodeficiency virus transmission should be added the well known risk of hepatitis B transmission, tetanus, sciatic paralysis and abscess at the site of injection.

It is generally agreed that some health care workers in Black Africa improperly use the intramuscular route of injection, especially for administration of quinine and antibiotics. We have carefully evaluated the incidence of injections performed in 4 dispensaries in Burkina Faso (district of Bobo-Dioulasso), observing the activity of the nurse in charge for one month, without influencing it in any way. The results (Table) demonstrate that the incidence per 1000 consultations was moderately high in one of the dispensaries and incredibly high in the 3 others (10 times greater in dispensary no. 3 than in dispensary no. 1). One should note that, in performing these injections, dispensaries nos 1, 2, and 3 respectively disposed of only 21, 250 and 14 syringes and 120, 700 and 70 needles (no data available for dispensary no. 4).

All this suggests that the behaviour of the health care workers is the decisive factor in the misuse of injections, and a priority for its prevention is the better training of paramedical staff. We personally think that this training should be a part of the programme of essential drugs rationalization now used by most developing countries, with WHO and UNICEF (FISE) help. It would promote the use of drugs which can be given orally, which are usually as effective as iniectable drugs in treating sexually transmissible diseases, respiratory tract infections, malaria, etc.

Table. Numbers of intramuscular injections given per 1000 consultations in 4 dispensaries in Burkina Faso

Dispensaries	Age group (years) 0–4	5–14	>15	Mean
1	78	118	157	118
2	517	909	895	773
3	750	1000	1482	1077
4	660	1565	751	992

A decrease in the number of injections should be complemented by better training in the methods of sterilization of syringes and needles for use when injections are indispensable (e.g. in treating meningitis). In the 2 dispensaries where we have inquired, the sterilization of syringes and needles was inadequate.

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To determine if the HIV-epidemic had reached Djibouti by autumn 1987, we investigated 645 subjects belonging to various risk groups; 150 were patients with a disease compatible with acquired immune deficiency or with a mycobacterial infection, 115 were young males having a sexually transmitted disase, 295 were female prostitutes, and 69 were villagers from a rural area; the remaining 16 belonged to other groups. All subjects answered an epidemiological questionnaire and had their serum tested for evidence of HIV antibodies. Eight sera were HIV-antibody positive by both ELISA and Western blot. Of these, 2 were from young men while 6 were from young women who admitted to prostitution. This accounts for an HIV seropositivity rate of 2.0%±1.6% in the prostitute population. Also, one antibody-positive subject was positive for circulating HIV antigen. Seven of the seropositive individuals had no general complaints or abnormal clinical signs. The eighth subject was a 28 year old man in hospital for pneumonia. We conclude that in Djibouti, in late

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